United States Department of Agriculture

Research, Education and Economics
Agricultural Research Service

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United States Fish and Wildlife Service
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Federal eRulemaking Portal
http:regulations.gov
Docket number: FWS-R8-ES-2014-0041

On October 7, 2014, the United States Fish and Wildlife Service (the Service) solicited a peer review from myself for their proposed rule to list the West Coast Distinct Population Segment of the fisher (fisher, DPS) as a threatened species under the Federal Endangered Species Act as well as their draft species report. In their solicitation letter, the Service has asked that I 'evaluate whether the best scientific and commercial information available was used in the proposed rule and draft species report.' Additionally, they have asked that I 'not provide an opinion of the Service's policy decision to propose the West Coast DPS of fisher for listing under the Act.' As such, the opinions I express in my review should be interpreted as my opinions on the quality of the information I have been asked to evaluate. The opinions I provide should not be interpreted as support or opposition to the Service's policy decision.

To a large extent I do feel that, to my knowledge, the best scientific and commercial information available was used in the proposed rule and draft species report. I do however, have some criticisms which I've tried to provide, as well as ways to address these criticisms. My main concerns regard habitat models which were presented but appear to lack a presentation of methodology. Further review indicates that this information is presented in an accessory document which is not cited in the species report. I feel this could be better integrated to provide a more straightforward message to the audience. I have tried to provide the information I think would be necessary to provide transparency to this analysis on my comments. Please feel free to contact me if further clarification is necessary.

Sincerely,

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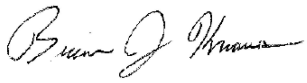

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Peer review of the proposed rule and draft species report for the proposed West Coast Distinct Popoulation Segment of the fisher (*Pekania pennanti*).

Brian J. Knaus

January 5, 2015

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1 Overview

The draft species report [1] represents an impressive and comprehensive aggregation of information on the biology, habitat and persistence of the West Coast Distinct Population Segment (DPS) of the fisher. The proposed ruling [2] appears to reflect this information. Information regarding our current understanding of the historical distribution of West Coast fishers, their present distribution as well as projections regarding their future modeled habitat are presented. Potential stressors, such as change in habitat due to climate change or land management practices are presented. As a whole, the document provides a comprehensive treatment of the West Coast DPS of the fisher and it's projected future, given numerous uncertain stressors which may affect its long term viability.

2 General comments

In recent history, fisher has been considered to consist of three subspecies: *Martes pennanti pennanti*, *M. p. columbiana* and *M. p. pacifica*. Recently, this taxon has been renamed to the monotypic genus *Pekania*. The West Coast DPS appears to be the portion of *M. p. pacifica* which occurs south of the Canadian border. I feel a brief review of the recent nomenclature, as well as a statment of the relationship of the West Coast DPS of the fisher to these taxonomic divisions, would help the audience understand what is referred to by the 'West Coast DPS.' Throughout the document a subset of *Pekania* (formerly *Martes*) is referred to as 'fisher.' However, I feel it is unclear as to whether the reference to 'fisher' within the document is to the 'West Coast DPS' or to fishers in general, including the east coast populations. I feel an explicit distinction needs to be made. The subspecies are mentioned in the 'Taxonomy' section, but I do not feel it is clear how the West Coast DPS is related to these subspecies. I feel it needs to be made clear what is being referred to. Particularly when reference is made to Rocky Mountain or Eastern North American populations which may provide surrogate information but may be biologically very different. Some sort of nomenclature which is adhered to throughout the document would help. Perhaps referring to 'DPS fisher' and 'non-DPS fisher' would help.

On page 8, a reference is made to Powell (1981). This reference appears to be ambiguous. Is it a book, a journal article, etc.? A quick google search was unsucsessful at identifying this reference. I feel it needs a more thorough citation.

On page 9, 1st full paragraph is a reference to 'regions.' Various regions are referred to throughout the document. Eventually, regions are introduced in Figure 11. Some form of nomenclature of 'region' and 'subregion' should be adhered to throughout the document to provide clarity. Because the regions in Figure 11 are rather arbitrary I feel they could be introduced earlier in the document. These regions could then be used as putative populations or management units which may or may not be supported by various lines of evidence throughout the document. I feel the important issue here is the identification of geographic units early in the document to help audiences which may not be intimately familiar with the geography or alternate systems of geographical classification which may have been used

historically.

Page 14, last paragraph, third line from the bottom. The term 'forests' appears twice in succession.

Fig. 19 is titled as 'Cultivations sites...'. What was cultivated is somewhat ambiguous. I believe these are marijuana cultivation sites and feel this should be added to the title.

3 Fisher habitat and the modeling of this habitat

Fishers are considered to be associated with low- to mid-elevation environments of coniferous and mixed conifer and hardwood forests [1]. This provides a descriptive estimate of fisher habitat, but a more quantitative description has been provided through modeling of this habitat. The details of this model are presented in a non-cited accessory article which is not directly cited in the draft species report. This creates the impression that the methodology for these habitat models was not presented. This methodology should either be integrated into the species report, or cited within it to provide transparency as to how these models were derived.

3.1 Habitat models

On page 18. The topic of spatial independence is raised, but not discussed. The authors of maxent do not appear to feel that the consideration of spatial correlation is desireable [4]. Also note that within the accesory document 'Habitat Modeling Methods for the Fisher West Coast Distinct Population Segment Species Assessment' the citation for maxent [4] is not included.

Page 19. 22 environmental predictors are mentioned in the model development but they are only refered to as 'e.g.'. These predictors are presented in the accessory document 'Habitat Modeling Methods for the Fisher West Coast Distinct Population Segment Species Assessment'. It would be helpful to state in the species report which of these predictors contributed to predicting fisher habitat. Predictors which were considered but not determined to be useful could also be presented here.

Is there any reason reports of fisher observation can not be made public? This information could be made available on figshare or dryad or other online databases. This would provide transparency in the analysis. If these observations are considered sensitive information they could be obfuscated by providing low resolution information. For example, information could be provided on one hundreth of a degree or a tenth of a degree as opposed to what the actual precision collected was. This obfuscation may affect the power of statistical analysis and should be explored. But at least a represenattive dataset could be made available to the public to aid transparency.

4 Conservation genetics of the fisher

Genetic studies of fisher from California appear to support a long term genetic differentiation among populations from Northern California and the (Southern) Sierra Nevada [3, 5]. In the interest of disclosure, I am the lead author of one of these manuscripts [3]. These results appear to support the concept that populations in the (Southern) Sierra Nevada represent a population which is separated from the Northern California population. This does not preclude the historical observation that fisher may be observed in the region which currently separates these populations. Observation of fishers within the region which separates the Sierra Nevada population from the Northern Californian population indicates the possibility of gene flow among these regions. However, the genetic data suggest that if some level of connectivity among the (Southern) Sierra Nevada popoulations and the Northern Californian populations did exist, it was relatively minor and may not have contributed to currently observed population structure.

5 Future habitat

A topic which I would like to entertain, which I do not feel was well addressed in the species report, is how managed landscapes may affect future fisher habitat. The models cited in the draft species report [1] suggest that much of current fisher habitat may be converted into shrubland or mixed hardwoods if left to natural processes. Much of our land is currently not left to natural processes. For example, private timberlands may try to preserve Douglas-fir stands on their properties. This may be accomplished by plantings and their success may be augmented by using seed sourced from drier or hotter seed zones (i.e., adaptive management). If private timberlands, or public, multi-use lands, are managed to preserve conifer or Douglas-fir stands, despite floristic responses due to climate change, this may drive future fisher habitat by preserving or creating new habitat. If this happens it could mean that fishers retreat to highly managed habitats as a 'refugia.' These highly managed forests may be exclusively forest managed for timber. This raises the question: of what quality is land managed for timber to fishers? If it is high relative to mixed hardwood forests, could we see a transition in fisher habitat from wildlands to timber managed stands in the future? How will this affect the Service's ability to manage for this taxon and preserve its future?

References

[1] U.S. Fish and Wildlife Service. Draft species report, fisher (*Pekania pennanti*), West Coast Population. *Unpublished draft*, 2014.

[2] U.S. Fish and Wildlife Service. Endangered and threatened wildlife and plants; threatened species status for west coast distinct population segment of fisher. *50 CFR Part 17*, pages 60419–60443, 2014.

[3] Brian J Knaus, Richard Cronn, Aaron Liston, Kristine Pilgrim, and Michael K Schwartz. Mitochondrial genome sequences illuminate maternal lineages of conservation concern in a rare carnivore. *BMC Ecology*, 11(1):10, 2011.

[4] Steven J. Phillips, Miroslav Dudik, and Robert E. Schapire. A maximum entropy approach to species distribution modeling. *Proceedings of the Twenty-First International Conference on Machine Learning*, pages 655–662, 2004.

[5] Jody M Tucker, Michael K Schwartz, Richard L Truex, Kristine L Pilgrim, and Fred W Allendorf. Historical and contemporary DNA indicate fisher decline and isolation occurred prior to the European settlement of California. *PloS one*, 7(12):e52803, 2012.